

Claims

What is claimed is:

1. A connecting duct for providing a fluid pathway between an outlet of a low pressure compressor and an inlet of a high pressure compressor, comprising:
 - a main body defining a fluid pathway adapted to direct a flow of fluid between a main body inlet and a main body outlet, the main body including:
 - a diffusing section adapted to decrease a velocity of the flow of fluid; and
 - a flow de-swirling section disposed between the diffusing section and the main body outlet, the flow de-swirling section adapted to straighten the flow of fluid.
2. The duct of claim 1, wherein the main body has a substantially circular cross-sectional shape.
3. The duct of claim 1, wherein the diffusing section has an inlet and an outlet and wherein the cross-sectional area of the diffusing section outlet is greater than the cross-sectional area of the diffusing section inlet.
4. The duct of claim 1, wherein the flow de-swirling section includes an arcuate portion.
5. The duct of claim 4, wherein the arcuate portion changes a direction of the flow of fluid between about 90° and 180°.
6. The duct of claim 5, further including a turning vane disposed in the de-swirling section and adapted to reduce the magnitude of turbulence in the flow of fluid.

7. The duct of claim 6, wherein a leading edge of the turning vane is disposed to engage the flow of fluid after the flow of fluid has passed through a predetermined distance in the arcuate portion.

8. The duct of claim 1, further including a flexible section adapted for connection to the outlet of the low pressure compressor.

9. A method of compressing a flow of fluid, comprising:
compressing a flow of fluid from a first pressure to an intermediate pressure with a first compressor;
reducing a velocity of the flow of fluid from the first compressor;
straightening the flow of fluid; and
compressing the flow of fluid from the intermediate pressure to a second pressure with a second compressor.

10. The method of claim 9, further including directing a flow of compressed fluid from the second compressor to an intake manifold of an internal combustion engine.

11. The method of claim 9, further including:
driving the first compressor with a first turbine; and
driving the second compressor with a second turbine.

12. The method of claim 11, further including directing a flow of exhaust gas from an exhaust manifold of an internal combustion engine to the first and second turbines to thereby drive the first and second compressors.

13. The method of claim 9, further including changing the direction of the fluid flow from the first compressor to the second compressor by between about 90° and 180°.

14. A system for compressing a fluid, comprising:

a first compressor having an inlet and an outlet;
a second compressor having an inlet and an outlet; and
a duct having a main body adapted to direct a flow of fluid
between the outlet of the first compressor and the inlet of the second compressor,
the main body further including:

a diffusing section adapted to decrease a velocity of the
flow of fluid; and

a flow de-swirling section disposed between the diffusing
section and the outlet of the main body, the flow de-swirling section adapted to
straighten the flow of fluid.

15. The system of claim 14, further including:

a first turbine adapted to drive the first compressor; and
a second turbine adapted to drive the second compressor.

16. The system of claim 14, wherein the diffusing section has
an inlet and an outlet and wherein the cross-sectional area of the outlet is greater
than the cross-sectional area of the inlet.

17. The system of claim 14, wherein the flow de-swirling
section includes an arcuate portion adapted to change a direction of the flow of
fluid between about 90° and 180°.

18. The system of claim 18, further including a turning vane
disposed in the arcuate portion of the de-swirling section and adapted to reduce
the magnitude of turbulence in the flow of fluid.

19. The system of claim 18, wherein a leading edge of the
turning vane is disposed to engage the flow of fluid after the flow of fluid has
passed through a predetermined distance in the arcuate portion.

20. A system for compressing a fluid, comprising:

a first compressing means for compressing a flow of fluid;

a second compressing means for further compressing the flow of fluid; and

a duct having a main body adapted to direct a flow of fluid between the first compressing means and the second compressing means, the main body further including:

a diffusing means for decreasing a velocity of the flow of fluid; and

a de-swirling means for removing a swirl from the flow of fluid, the de-swirling means disposed between the diffusing means and the inlet of the second compressing means.